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January 23, 1997

Commanding Officer
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Subject: CTO-094; NSA Memphis RCRA Facility Investigation, Millington, Tennessee

Document Transmittal — Additional Revision 2 errata pages for Assembly B RFI Report, NSA Memphis

Reference: Contract N62467-89-D-0318 (CLEAN II)

Dear Sir:

Please find enclosed one copy of additional errata pages to the NSA Memphis *Assembly B RFI Report, Revision 2*, dated January 3, 1997. As requested, copies have been distributed to the BRAC Cleanup Team and others as shown on the attached NSA Memphis RFI Distribution List.

These additional errata pages go into Section 8 of the report on the Northside Industrial Drainage Ditches (SWMUs 4, 6, 10, 31, and 38) and were necessary because the USEPA requested clarification regarding uncertainties related to the Ecological Risk Assessment. Please replace the previously distributed Revision 2 pages 8-5, 8-6, 8-31, and 8-32 with the enclosed updated Revision 2 versions.

If you have any questions or comments of a technical nature, please contact Jim Rathbone or Lawson Anderson at 901/372-7962. Comments or questions of a contractual nature should be directed to Debra Blagg at 901/386-9344.

Sincerely,

EnSafe/Allen & Hoshall

By: James. A. Rathbone, Jr.
Senior Environmental Scientist

Enclosures: As Stated

cc: Contracts File: CTO-94 (w/out enclosure)
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ditch above the confluence with North Fork Creek, were derived using the maximum value from either the original sediment sample or its duplicate collected from the 0- to 6-inch sampling interval at location 6-6. This location was selected as a reference due to an obvious lack of contamination source nearby. RCs for sediment samples from North Fork Creek were established from a sample (38-7) collected upstream of the drainage ditch-North Fork Creek confluence. It was assumed that off-site transport of contaminants into North Fork Creek would only be found downstream of the confluence. The SSVs represent effects levels derived from either three studies which were focused in coastal areas throughout the United States or the contract required quantitation limit (CRQL) for that particular contaminant. Their application in freshwater environments, as at NSA Memphis, may not be truly applicable. Also, SSVs do not consider the influences of total organic carbon, grain size, or other site-specific factors that may influence contaminant bioavailability in sediment.

For this assessment, if contaminant concentrations exceed the RC they may be considered site-related. If a contaminant concentration was greater than its RC, it was then compared to its SSV. An exceedance of an SSV indicates that a potential ecological impact to sensitive aquatic life species may be present. SSVs exist for only a limited number of contaminants, but were used whenever possible.

8.2 Contaminant Characteristics

The toxic effects of the major constituents detected within the sediment of the drainage ditches are discussed below. Limited information exists for many of the contaminants detected, but is discussed where appropriate. It should also be recognized that site-specific conditions play a large role in determining contaminant toxicity, bioavailability, fate, and transport.

8.2.1 Organics

SVOCs

PAHs vary by molecular weight and comprise most of the SVOCs detected in the drainage ditch system and North Fork Creek. With increasing molecular weight, aqueous solubility generally decreases; the octanol-water partitioning coefficient (K_{ow}) generally increases thus increasing solubility in fats; resistance to oxidation and reduction generally decreases; and vapor pressure generally decreases (Eisler, 1987). Accordingly, PAHs of different molecular weight vary substantially in their behavior and distribution in the environment and in their biological effects. In water, PAHs either evaporate, disperse into the water column, become incorporated into sediments, or undergo degradative processes such as photooxidation, chemical oxidation, and biological transformation by bacteria and animals (Neff, 1979).

Most environmental concern has focused on PAHs that range in molecular weight from 128.16 (naphthalene) to 300.36 (coronene). Generally, lower molecular weight PAH compounds, containing two or three aromatic rings, exhibit significant acute toxicity but are not carcinogenic. High molecular weight PAH compounds, four to seven rings, are significantly less toxic, but are demonstrably carcinogenic, mutagenic, or teratogenic to aquatic species. PAHs show little tendency to biomagnify in the food chain because most are rapidly metabolized (Eisler, 1987). Very little information is available on food chain adverse effects as a result of soil PAH contamination and relatively few field studies have addressed PAH toxicity in sediment.

Organochlorine Pesticides

Organochlorine pesticides have been used extensively in the U.S. since the 1940s. They appear to be ubiquitous in the environment, being found in surface water, sediment, and biological tissues. They are readily absorbed by warm-blooded species and degradatory products are frequently more toxic than the parent form. Food chain biomagnification is usually low, except

- Synergistic and/or antagonistic relationships among contaminants were not accounted for.

- A lack of criteria or screening values for many chemicals compounds the uncertainty for screening-level assessments.

- Toxicological effects studies may be different at individual versus community levels.

- Extrapolation of literature-generated effects levels to onsite species and communities does not account for site-specific conditions.

- Application of SSVs in freshwater environments, such as at NSA Memphis, may not be applicable, because they were derived from studies focused in coastal areas.

- SSVs do not consider the influences of total organic carbon, grain size, or other site-specific factors that may influence contaminant bioavailability in sediment.

- SSVs exist for only a limited number of contaminants, but were used whenever possible.

8.7 Recommendation

Based on the above information, it is recommended that no further study be conducted on the drainage ditches and North Fork Creek from an ecological perspective. Concentrations do not appear to represent a single source and runoff characteristics across the area most likely will remain the same. The best remedial action would be no action and let the contamination present in the sediment naturally attenuate.

Additional sediment/soil samples were collected from the surface of the landfill and within the gullies leading from the landfill during a confirmatory sampling investigation (CSI) conducted at SWMU 10 in May 1996. The results for these samples will be reported in the SWMU 10 CSI Report which is currently being prepared.